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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/731,385	12/06/2000	Myeong-cheol Kim	SAM-164	8322

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Mills & Onello LLP
Eleven Beacon Street
Boston, MA 02108

EXAMINER
NADAV, ORI

ART UNIT	PAPER NUMBER
2811	

DATE MAILED: 06/26/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/731,385	KIM ET AL.	
	Examiner	Art Unit	
	ori nadav	2811	

– The MAILING DATE of this communication appears on the cover sheet with the correspondence address –

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *29 May 2003* .

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-11 and 14-20* is/are pending in the application.

4a) Of the above claim(s) *16-20* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-11,14 and 15* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless --
>
> > (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.
> > (e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371© of this title before the invention thereof by the applicant for patent.

2. Claims 1-2, 4-7, 10 and 15 are rejected under 35 U.S.C. 102(b) as being anticipated by Kondo et al. (5,075,762).

Regarding claims 1, 4-7 and 15, Kondo et al. teach in figure 4 and related text a semiconductor device having a self-aligned contact, the semiconductor device comprising: a plurality of conductive patterns formed to be adjacent to one an other by sequentially stacking and patterning a first conductive layer 3 and a mask layer 5 on a particular underlying layer 1; a first insulation layer 4 filling a gap between adjacent conductive patterns the first insulation layer being formed of a first insulating material, a second insulation layer 11 having a spacer shape, the second insulation layer formed at the sides of each conductive pattern and over the first insulation layer; the second insulation layer being formed of a second insulating material different from the first

insulating material, and a second conductive layer 8 filling a contact hole which is self-aligned with respect to the second insulation layer between adjacent conductive patterns, the contact hole passing through the first insulation layer, the first insulation layer extending between adjacent conductive patterns and between the second conductive layer and the conductive patterns and having a planar top surface throughout the entire distance between adjacent conductive patterns.

Regarding claim 2, Kondo et al. teach in figure 4 a top of the first insulation layer 4 being lower than the top of the first conductive layer 3 of each conductive layer pattern.

Regarding claim 4-7, Kondo et al. teach in figure 4 an etching rate of the first insulation layer is larger than that of the second insulation layer, the dielectric constant of the first insulation layer is smaller than that of the second insulation layer, wherein the first insulation layer is formed of a silicon oxide layer and the second insulation layer is formed of a silicon nitride layer.

Regarding claim 15, Kondo et al. teach in figure 4 the first conductive layer of each conductive layer pattern is a gate electrode, and the contact contacts the surface of a semiconductor substrate.

Regarding claim 10, Kondo et al. teach in figure 4 a fourth insulation layer 10 provided on the surface of the underlying layer except for a portion contacting the second conductive layer and on the surfaces of the conductive layer patterns.

3. Claims 1-8, 10 and 15 are rejected under 35 U.S.C. 102(e) as being anticipated by Nguyen (6,472,261).

Regarding claims 1, 4-7 and 15, Nguyen teaches in figure 6 and related text a semiconductor device having a self-aligned contact, the semiconductor device comprising: a plurality of conductive patterns formed to be adjacent to one an other by sequentially stacking and patterning a first conductive layer 14 and a mask layer 18 on a particular underlying layer 10; a first insulation layer 22 filling a gap between adjacent conductive patterns the first insulation layer being formed of a first insulating material, a second insulation layer 28 having a spacer shape, the second insulation layer formed at the sides of each conductive pattern and over the first insulation layer; the second insulation layer being formed of a second insulating material different from the first insulating material, and a second conductive layer 42 filling a contact hole which is self-aligned with respect to the second insulation layer between adjacent conductive patterns, the contact hole passing through the first insulation layer, the first insulation layer extending between adjacent conductive patterns and between the second

conductive layer and the conductive patterns and having a planar top surface throughout the entire distance between adjacent conductive patterns.

Regarding claim 2, Nguyen teaches in figure 6 a top of the first insulation layer 22 being lower than the top of the first conductive layer 14 of each conductive layer pattern.

Regarding claims 3, Nguyen teaches in figure 6 and related text the top of the first insulation layer 22 (the first insulation layer 22 is taken as the horizontal layer 22 and the vertical layer adjacent to the first conductive layer 14) is higher than the top of the first conductive layer 14 of each conductive layer pattern.

Regarding claim 4-7, Nguyen teaches in figure 6 an etching rate of the first insulation layer is larger than that of the second insulation layer, the dielectric constant of the first insulation layer is smaller than that of the second insulation layer, wherein the first insulation layer is formed of a silicon oxide layer and the second insulation layer is formed of a silicon nitride layer.

Regarding claim 8, Nguyen teaches in figure 6 a third insulation layer provided between the first insulation layer and the sides of each conductive layer pattern and between the second insulation layer and the side of the conductive layer pattern.

Regarding claim 10, Nguyen teaches in figure 6 a fourth insulation layer 34 provided on the surface of the underlying layer except for a portion contacting the second conductive layer 42 and on the surfaces of the conductive layer patterns.

Regarding claim 15, Nguyen teaches in figure 6 the first conductive layer of each conductive layer pattern is a gate electrode, and the contact contacts the surface of a semiconductor substrate.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which the subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kondo et al. or Nguyen.

Regarding claim 11, Kondo et al. and Nguyen teach substantially the entire claimed structure, as applied to dependent claim 10 and independent claim 1 above, except stating that the third and fourth insulation layers are formed at a thickness of 50-200 A. It would have been obvious to a person of ordinary skill in the art at the time the invention was made to use third and fourth insulation layers at a thickness of 50-200 A in Kondo et al. and Nguyen's device, because it is well within the skills of an artisan to optimize the performance of the device by forming the third and fourth insulation layers at the required thickness.

6. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Nguyen. Regarding claim 9, Nguyen teach substantially the entire claimed structure, as applied to dependent claim 8 and independent claim 1 above, except stating that the third and fourth insulation layers are formed at a thickness of 50-200 A. It would have been obvious to a person of ordinary skill in the art at the time the invention was made to use third and fourth insulation layers at a thickness of 50-200 A in Nguyen's device, because it is well within the skills of an artisan to optimize the performance of the device by forming the third and fourth insulation layers at the required thickness.

7. Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kondo et al. or Nguyen in view of Huang (5,899,722).

Kondo et al. or Nguyen teach substantially the entire claimed structure, as applied to claim 1 above, except using the first conductive layer of each conductive layer pattern as a bit line, and the second conductive layer to connect a storage electrode of a semiconductor capacitor to a semiconductor substrate.

Huang teaches that a self aligned contact structure, similar to that disclosed by Chang et al., can be used in a DRAM. A DRAM comprises a first conductive layer being a bit line, and a second conductive layer serves to connect a storage electrode of a semiconductor capacitor to a semiconductor substrate. It would have been obvious to a person of ordinary skill in the art at the time the invention was made to use Kondo et al. and Nguyen's device in a DRAM device in order to use the device in a specific application which requires a DRAM device. Note that a recitation of the intended use of the claimed invention must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim. See *In re Casey*, 152 USPQ 235 (CCPA 1967) and *In re Otto*, 136 USPQ 458, 459 (CCPA 1963).

Response to Arguments

8. Applicant's arguments with respect to claims 1-11 and 14-15 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

9. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL.** See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Papers related to this application may be submitted to Technology center (TC) 2800 by facsimile transmission. Papers should be faxed to TC 2800 via the TC 2800 Fax center located in Crystal Plaza 4, room 4-C23. The faxing of such papers must conform with the notice published in the Official Gazette, 1096 OG

30 (November 15, 1989). The Group 2811 Fax Center number is (703) 308-7722 and 308-7724. The Group 2811 Fax Center is to be used only for papers related to Group 2811 applications.

Any inquiry concerning this communication or any earlier communication from the Examiner should be directed to *Examiner Nadav* whose telephone number is **(703) 308-8138**. The Examiner is in the Office generally between the hours of 7 AM to 4 PM (Eastern Standard Time) Monday through Friday.

Any inquiry of a general nature or relating to the status of this application should be directed to the **Technology Center Receptionists** whose telephone number is **308-0956**

O.N.
June 23, 2003

ORI NADAV
PATENT EXAMINER
TECHNOLOGY CENTER 2800